NJDEP
Bureau of Freshwater & Biological Monitoring

Lake Monitoring Overview

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Water Monitoring and Standards

NJDEP
Lake Monitoring Overview

Topics Covered

- **Ambient Lake Monitoring Network**
- **Surface Water Quality Standards**
- **TMDL**
- **Swimming Guidelines**

Ambient Lake Monitoring Network

- **The primary purpose of the Lakes Monitoring Network is to provide a statistically valid estimate of overall lake water quality in the State.**

- **Data collected from the 200 probabilistically selected lakes statistically represents all lakes in NJ meeting the design criteria.**

- **Estimates can be made on the Statewide condition of all lakes meeting design criteria.**

Ambient Lake Monitoring Network Target Population

- **Man-made or natural**
- **Wholly or partially within NJ's political boundaries**
- **Water supply reservoirs with active draw downs and water exchanges not included.**
- **Lake size at least two hectares (5 acres) in area.**
- **Depth of approximately one meter at the deepest point measured.**

New Jersey Ambient Lake Monitoring Network
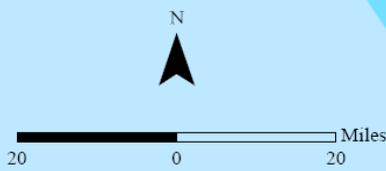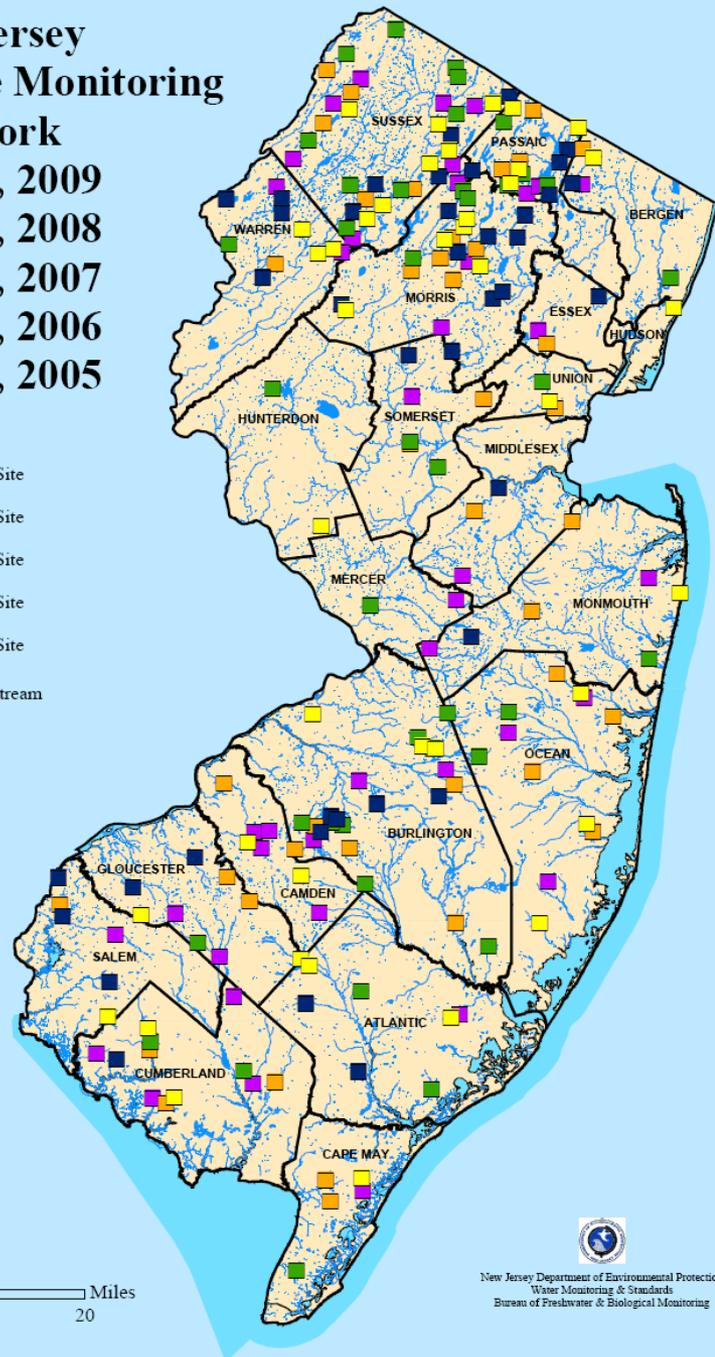
Panel 5, 2009
Panel 4, 2008
Panel 3, 2007
Panel 2, 2006
Panel 1, 2005

■ Panel 5 Lake Site
■ Panel 4 Lake Site
■ Panel 3 Lake Site
■ Panel 2 Lake Site
■ Panel 1 Lake Site
〜 Major River/Stream
■ Lake/Pond
☐ County

N

Miles
20   0   20

New Jersey Department of Environmental Protection
Water Monitoring & Standards
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Sample Parameters

- **Total Phosphorus***
- **Total Kjeldahl Nitrogen**
- **Nitrite+Nitrate Nitrogen**
- **Ammonia Nitrogen**

- **Secchi depths**
- **Chlorophyll "a"**
- **Dissolved Oxygen***
- **Temperature**
- **Specific Conductance**
- **pH***
- **Alkalinity**
- **Hardness**
- **Turbidity**

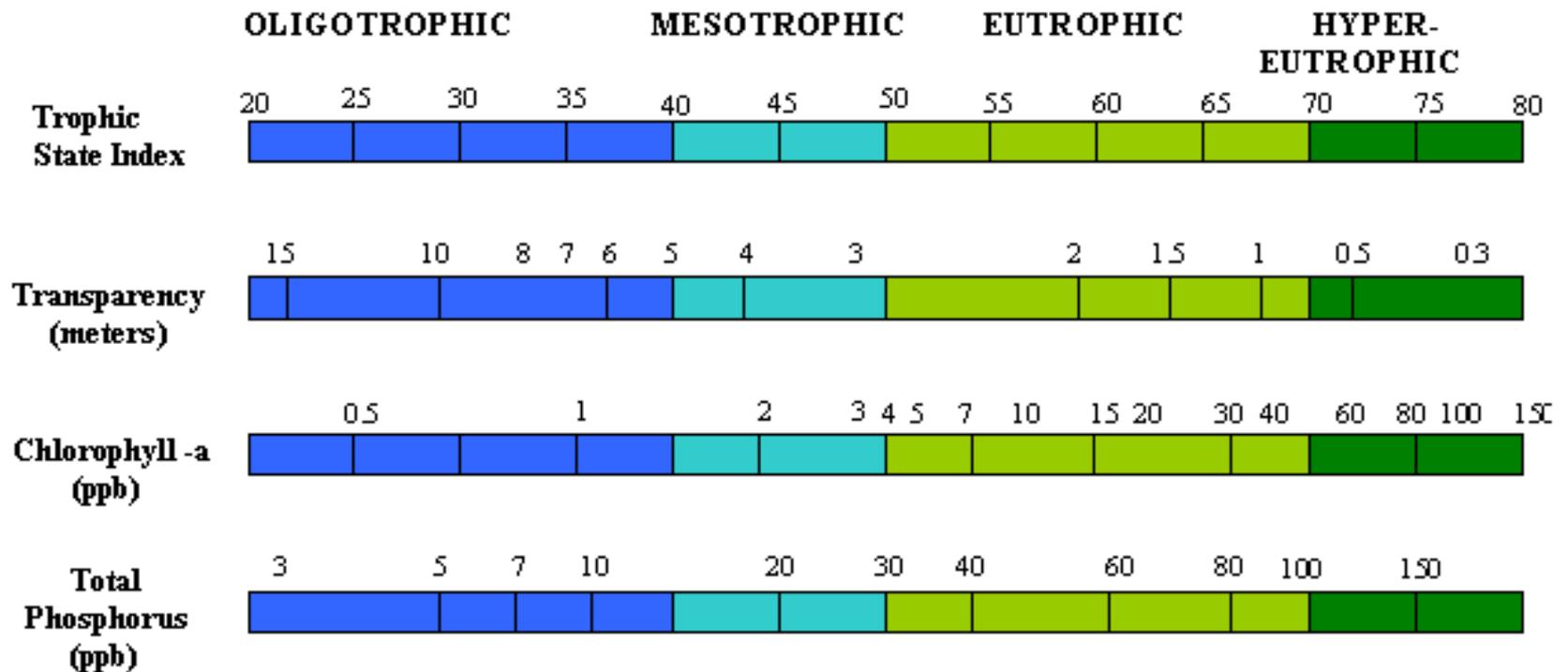***Surface Water Quality Standard (SWQS)**

Trophic State Assessment

- **Eutrophication – Aging process of lakes moving toward increased plant growth.**

- **Cultural eutrophication can rush lakes into eutrophic conditions in a matter of a human generation or two.**

Trophic Status Assessment
Carlson's Trophic State Index (TSI)

Surface Water Quality Standards (SWQS)

- In accordance with Section 305(b) and 303(d) of the Federal Clean Water Act (CWA), the State DEP is required to assess the overall water quality of the State's waters.

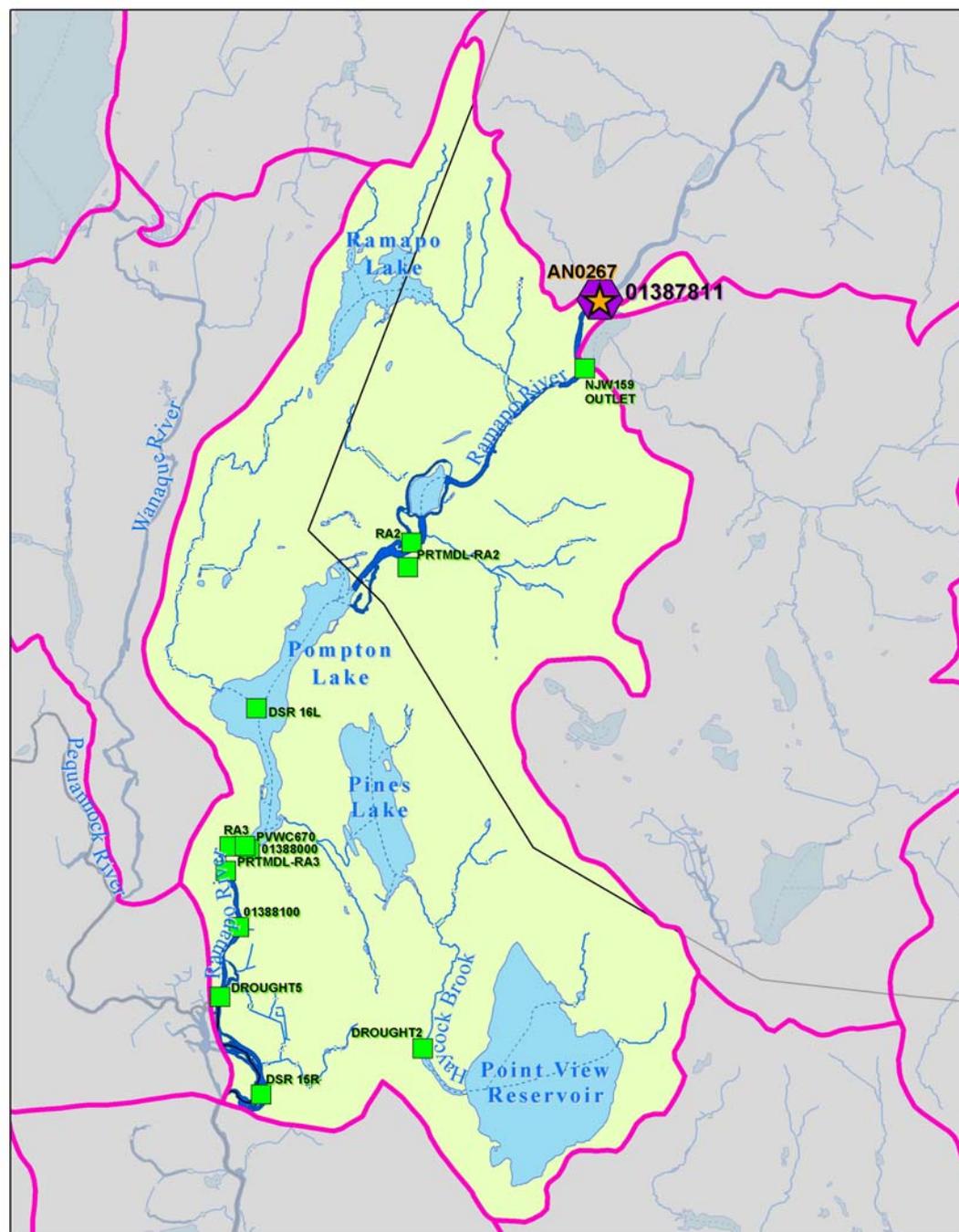- *"New Jersey Integrated Water Quality Monitoring and Assessment Report"*

Surface Water Quality Standards (SWQS)

- **The Integrated List of Waters ("305(b) Report"):** Identifies the use assessment results for all waters of the State, grouped into subwatershed-based assessment units.

- **The 303(d) List of Water Quality Limited Waters ("303(d) List"):** Identifies all waters that do not support an applicable designated use because of a chemical pollutant.

- Impaired waterbodies require TMDL.

Assessment Unit

Surface Water Quality Standards (SWQS)

For lakes there are three parameters with numeric SWQS criteria:

- **Total Phosphorus (TP) > 0.05 mg/L**
- **Dissolved Oxygen (DO) < 4.0mg/l**

  (There is also a daily average criteria of 5mg/l, which is not applicable to the sampling methods used for this monitoring network)

- **pH 3.5 - 8.5 SU***

  *6.5 – 8.5 SU for lakes within waters designated as FW2 waters in the Upper Delaware, Upper Raritan, Passaic, and Wallkill River Basins.

  *4.5 - 7.5 SU for lakes within FW2 waters in the Atlantic, Lower Delaware, and Lower Raritan River basins.

  *3.5 - 5.5 SU for lakes designated as PL waters.

Probabilistic Estimate of Lakes Attaining SWQS

Indicator	Category	Number of Lakes	Estimate % Lakes
Total Phosphorus Impairment	Fail	30	15.5
Total Phosphorus Impairment	Pass	169	84.5
Dissolved Oxygen Impairment	Fail	5	2.6
Dissolved Oxygen Impairment	Pass	194	97.4
pH Impairment	Fail	28	14.0
pH Impairment	Pass	171	86.0
OVERALL ASSESSMENT	Full Support	142	71.0
OVERALL ASSESSMENT	Not Support	57	29.0

Total Maximum Daily Load (TMDL)

- A TMDL is developed to identify all the contributors of a pollutant of concern and the load reductions necessary to meet the Surface Water Quality Standards (SWQS) relative to that pollutant.

- A TMDL represents the assimilative or carrying capacity of a waterbody, taking into consideration point and nonpoint source of pollutants of concern, natural background and surface water withdrawals.

Total Maximum Daily Load (TMDL)

"Total Maximum Daily Load Report to Address

Phosphorus Impairment in

Pompton Lake and Ramapo River in the

Northeast Water Region"

- Adopted 2008

- http://www.nj.gov/dep/wms/bear/pomptonlake_tmdl_adopt.pdf

Total Maximum Daily Load (TMDL)

- This report establishes Phosphorus TMDLs for portions of the Ramapo River and Pompton Lake.

- Proposes management measures in an implementation plan to attain applicable surface water quality standards and designated uses in the river and lake.

Total Maximum Daily Load (TMDL)

- Bureau of Environmental Analysis and Restoration (BEAR)

- http://www.state.nj.us/dep/wms//bear/index.html

Swimming

- A public bathing beach is required to be life guarded and must comply with a series of safety requirements.

- Fecal coliform must be monitored. The FC standard is 200 fc/100mL.

Swimming

- Sampling is conducted at least once/week, at the beach area.
  Any failure requires an immediate resample.

- Beach closing is required after two consecutive failed samples.

Swimming

- Public recreational lakes are usually sampled by either health dept staff or private labs and results go to either the county or local health dept.

- Private lakes (w/ bathing beaches) hire their own labs and self-monitor.

Swimming

- Requirements do not apply if bathing beach is not present at a lake.
- DEP and Dept of Health (state, county, or local) do not allow posting of "swim at your own risk" signs, as this actually encourages swimming.
- If interested parties wish to open a bathing beach, contact local health dept to start the process.

Additional information on the Ambient Lakes Monitoring Program can be obtained from:

WM&S/ Bureau of Freshwater & Biological Monitoring

609-292-0427

www.state.nj.us/dep/wms/bfbm.